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AN INSTRUCTIONAL MODEL OF THE COMPOSING SITUATION

Ann Humes

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AN INSTRUCTIONAL MODEL OF THE COMPOSING SITUATION

Ann Humes

Scholarly concern with composition traditionally focused on analysis and criticism of the resulting document rather than on the means of producing it. However, scholars have become increasingly concerned with instruction that focuses on the process rather than on the product of writing. For example, Shaughnessy (1977) maintains that

> . . . the composition course should be the place where the writer not only writes but experiences in a conscious, orderly way the stages of the composing process itself. English teachers have been trained to look for and at the end product (the completed theme) without questioning the writer's way of composing it . . . (p. 81).

Among the many authorities who advocate instruction in the composing process are Lawrence (1972), Odell (1974, 1975, 1977, and 1980), D'Angelo (1975), Winterowd (1975), Gundlach (1977, 1980), Graves (1978), Lopate (1978), Mellon (1978), Petty (1978), Draper (1979), Irmscher (1979), Larson (1979), Nold (1979a and b), Pianko (1979), Kroll (1980), Popham (1980), and Taylor (1980).

Because interest in writing research is a relatively recent development (Gundlach, 1980), the literature documents few empirical examinations of the composing process, and these investigations generally consist of case studies involving a small number of students (e.g., Emig, 1971; Mischel, 1974; Stallard, 1974; Graves, 1975; Flower and Hayes, 1977 and 1980b; Pianko, 1979; Perl, 1979).

The literature deals more extensively with theoretical interpretations of the composing process (e.g., Rohman, 1965; Young, Becker, and Pike, 1970; Lawrence, 1972; Legum and Krashen, 1972; Elbow, 1973; Britton, 1975 and

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1978; Odell, 1977; Murray, 1978; Applebee, 1979; Bereiter, 1979; Nold, 1979a and b; Krashen, 1980).* However, most theoretical models describe a linear process despite the work of researchers like Perl (1979), who denies that the composing process is linear. Furthermore, theoretical models are often unsubstantiated--they do not have a research base--and they do not facilitate specifying composition instruction because they lack adequate detail. Finally, and most importantly, these models reflect a process that describes, according to Flower and Hayes (1980a), the "growth of the writing product, not . . . the inner process of the person producing [the product]" (p. 3).

Other authorities also cite a need for models that reflect the inner mental process of the writer rather than the outer process that is manifested by the creation of a product (e.g., Mandel, quoted in Rinderer, 1980, p. 6; Bereiter, 1979; Lawrence, 1972). Bereiter (1979) declares that such a model would have to deal ". . . with the cognitive moves that make up writing and their organization; with levels of processing, from the highly conscious and intentional to the unconscious and automatic; and with how processing capability is deployed to these various functions in such a way as to enable writing to go on" (p. 151).

In answer to the call for such a viable model of the inner processes of the writer, one was presented at a recent conference on composition. This model was developed by Linda Flower and John Hayes (1980a) and is the reference point for the model presented here. The Flower and Hayes model

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*For a discussion of the literature on the composing process, see Humes (forthcoming e).

is a cognitive model; it seeks to reflect the inner mental processes of the writer. The model presented here converts the cognitive model into an instructional model. That is, it provides the basis for specifying instruction in the composing process as well as instruction on pertinent strategies and tactics relevant to composing.

The paper first presents and describes the cognitive model as formulated by Flower and Hayes. The paper then presents and describes the instuctional model.

THE COGNITIVE MODEL

Most models have a purely theoretical foundation, but the Flower and Hayes model is supported by research: Much of their information about the composing process is based on their analysis of protocols. Protocols are transcripts prepared from tape recordings of the "out-loud" thinking of writers as they compose.* Flower and Hayes have analyzed a five-year accumulation of these protocols. From this analysis, they have identified both the mental activities that occur during composing and the signals for these activities. Their model is displayed in Figure 1.

The Flower and Hayes model incorporates the following four research findings that support its creators' contention that the model reflects the inner processes of the writer:

1. The process of writing is best understood as a set of distinctive thinking processes which writers orchestrate or organize during the act of composing.

2. The organization of these writing processes is highly recursive.

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*It should be noted that these tape recordings are not of oral composing, but of the strategies or problem-solving activities that occur during writing.

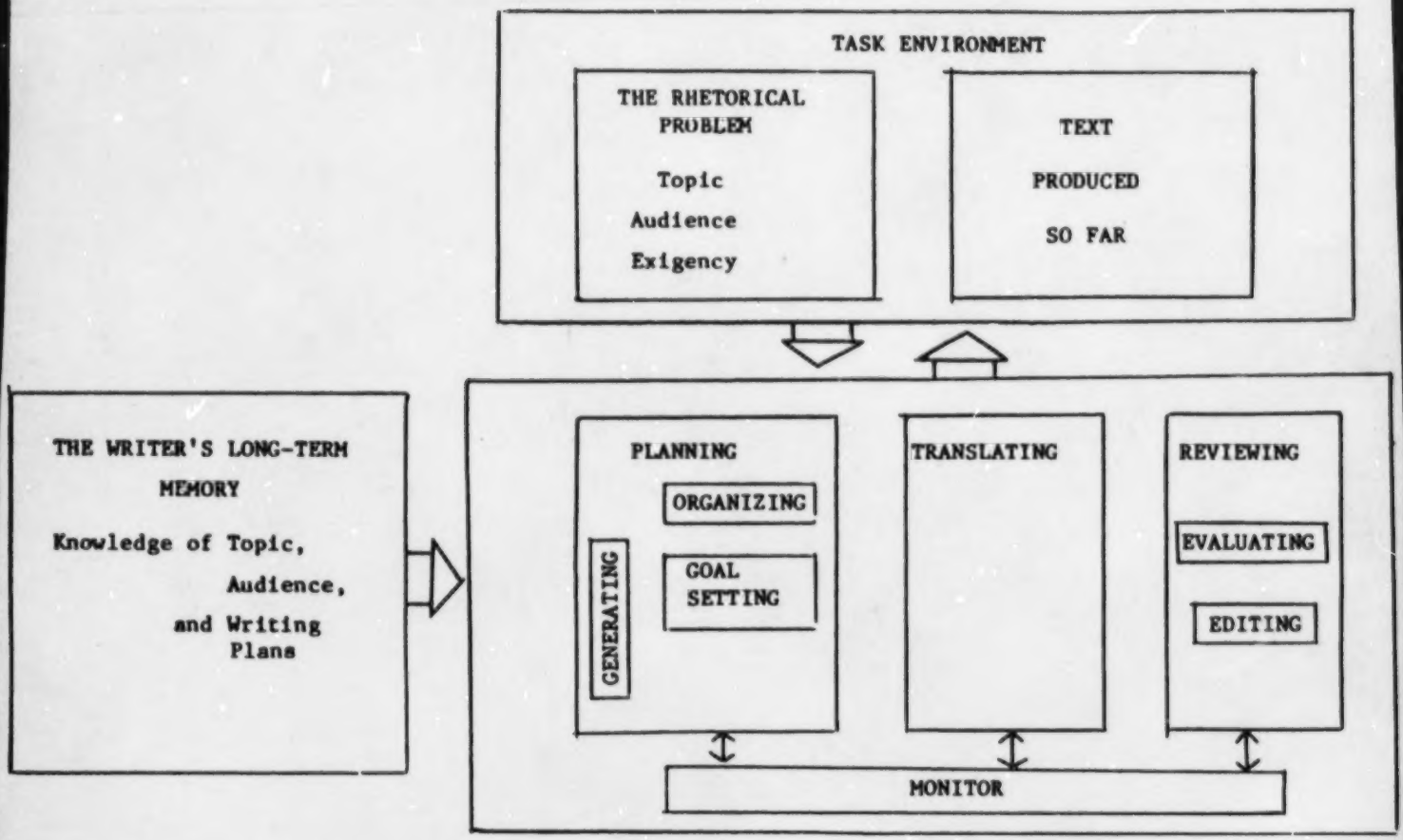

Figure 1. Structure of the Flower and Hayes Model (1980a, p. 6)

3. The act of composing itself is a goal-directed thinking process, guided by the writer's own growing network of goals.

4. Writers create their own goals in two key ways: by generating supporting sub-goals which carry out a purpose and by, at times, changing major goals or even establishing entirely new ones in light of what they have learned by writing. (pp. 2-3)

The Flower and Hayes model of the rhetorical situation includes three major units: (1) the Task Environment, which consists of everything "outside the writer's skin" (p. 7), including the Rhetorical Problem and the Text; (2) the writer's Long-Term Memory, where the writer stores knowledge he or she elicits during composing; (3) the Composing Process itself.

Flower and Hayes consider the problem to be the most important element at the beginning of composing because writers solve "only the problem they represent to themselves" (p. 8). A school assignment is their example of a typical but simplified version of the Problem. The elements of their Rhetorical Problem are Topic, Audience, and Exigency; the exigency is the task that is "waiting to be done" (Bitzer, 1968, p. 6). They choose these elements because other options do not account for how "writers actually integrate those powerful forces and produce prose . . ." (p. 2). However, the Flower and Hayes model does not account for this integration either. In fact, Flower and Hayes, in discussing the Rhetorical Problem, comment that discovering how this element works and affects the writer is an "important goal for research . . ." (p. 8).

The second element of the Task Environment is the growing Text itself. Flower and Hayes explain, "As composing proceeds, a new element enters the Task Environment which places even more constraints upon what the writer can say. Just as a title constrains the content of a paper and a

topic sentence shapes the options of a paragraph, each word in the growing text determines and limits the choices of what can come next" (p. 8).

Another unit of the Flower and Hayes rhetorical situation is the Long-Term Memory, which, they say, "can exist in the mind as well as in outside resources such as books, [and] is a storehouse of knowledge about the topic and audience, as well as knowledge of writing plans and problem representations" (p. 9).

The Composing Process itself consists, in the Flower and Hayes model, of Planning, Translating, and Reviewing.* These processes are recursive. According to Flower and Hayes, recursion "occurs when an entire process (such as PLAN, TRANSLATE, REVIEW) is called into action as a sub-routine to help carry out the current process; it is embedded within itself" (p. 14). Concomitantly, Flower and Hayes criticize linear models of the process because such "stage" models (1) do not reflect the cognitive process of the writer, (2) do make sharp distinctions between the operations that "may seriously distort the real nature of these task" (p. 3), and (3) do offer "an inaccurate, even misleading description of the more intimate, moment-by-moment intellectual processes of composing" (p. 4).

Other authorities also characterize the writing process as recursive:

> The process is . . . cumulative and cyclical throughout. The writer does not put aside what he has done once it has served its immediate purpose (Young, 1977, p. 7).
>
> . . . planning, transcribing and reviewing are not one-time processes, as composition textbooks would have students believe. Rather, the text grows and changes; planning, transcribing and reviewing what has been written occur in irregular patterns (Nold, 1979, p. 2).

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*A "prewriting" component is not included because the label itself implies that cognitive activities preceding actual graphic symbolization are not a part of the composing process.

> . . . the recursive elements in the writing process should be isolated and understood by students as constituent acts in every episode of writing (Schor, 1976, p. 79).

> . . . the process can be viewed as moving generally cyclically, the writer shifting his focus of attention repeatedly among matters of content, style, and structure during each cycle (Young, 1976, p. 34).

> . . . [the writer moves] in a series of non-linear movements from one sub-process to another while he constantly moves the force of his attention among matters of content, style, and structure; solving continuous sets and sub-sets of complex cognitive, lexical, syntactical, and rhetorical problems" (Sommers, 1978, pp. 8-9).

During the Planning element of the process, which includes Generating, Organizing, and Setting Goals,

> . . . writers form an internal representation of knowledge that will be used in writing. This internal representation of one's knowledge may be in language but it might also be represented as visual or perceptual information, e.g., as a fleeting image the writer must then capture in words. Unlike 'pre-writing,' PLANNING is a cognitive process that precedes each utterance (Flower and Hayes, 1980a, p. 10).

Generating is described as "retrieving relevant information from long-term memory" (p. 10), and this information is sometimes so well developed that it is generated as standard written English. At other times it is "fragmentary, unconnected, even contradictory . . ." (p. 10).

Organizing is explained as

> . . . essentially the act of re-organizing information which is generated in one form, but must be tailored to the writer's purpose . . .. The process . . . involves not only the act of creating subordinant relationships, but of seeing new ideas as part of a larger category . . . (p. 10).

The third subprocess of Planning is Setting Goals. Flower and Hayes' (1980a and 1980b) studies have indicated that setting goals "is an important

part of 'being creative' and can account for some important differences between good and poor writers" (1980a, p. 24).

Flower and Hayes determined that Setting Goals is a part of the Composing Process when they analyzed their five-year collection of protocols. The protocols offer evidence that composing is highly episodic, with short bursts of sustained thought. The boundaries of these short bursts correspond to the enunciating, exploring, and carrying out of goals and sub-goals, such as "Open with a question" (p. 24).

Another element of Flower and Hayes' model of the composing process is Translating, which is "essentially the process of putting ideas into visible language" (p. 11). The term Translating is used "in order to emphasize peculiar qualities of the task. The information generated in PLANNING may be represented in a variety of symbol systems other than language . . .. So the writer's task is to translate a meaning . . . into a linear piece of written English" (p. 11).

Translating "requires the writer to juggle all the special demands of written English . . ." (p. 12), and for "inexperienced writers this extra burden may overwhelm the limited capacity of a short-term memory" (p. 12).

Reviewing, the final recursive element of their Composing Process, is described as a

> . . . process in which writers choose to read what they have written either as a springboard to further Translating or with an eye to systematically Evaluating and/or Editing the text. These periods of planned REVIEWING frequently lead to new cycles of PLANNING and TRANSLATING (p. 12).

Flower and Hayes categorize Editing and Evaluating as subprocesses of Reviewing, explaining that these subprocesses may "interrupt any other process and occur at any time in the act of writing" (p. 13).

A Monitor is included in the model as the "writing strategist which determines when the writer moves from one process to the next" (p. 13). They cite, as an example of its operation, its ability to determine "how long a writer will continue generating ideas before attempting to write prose" (p. 13).

It is thus evident from the description of the elements of their model that Flower and Hayes have proposed a paradigm that far more closely reflects the inner processes of the writer than do the earlier theoretical models that posited a three-stage phenomenon consisting of prewriting, writing, and rewriting (e.g., Rohman, 1965). Consequently, this current model provides more information for developing an instructional model of the composing situation.

THE INSTRUCTIONAL MODEL

The instructional model presented below draws extensively from the cognitive model developed by Flower and Hayes (1980a). Concomitantly, the description of the Flower and Hayes' components apply to the instructional model unless contrasts or discrepancies are explained.

Three criteria for constructing a model that reflects the inner processes of the writer are listed by Flower and Hayes (1980a):

> 1. First, you would need to define the major elements or subprocesses that make up the larger process of writing . . ..
>
> 2. Secondly, you would want to show how these various elements of the process interact in the process of writing . . ..

3. And finally, since a model is primarily a tool for thinking with, you would want your model to speak to critical questions in the discipline. (p. 5)

The instructional model presented here meets these criteria. It defines subprocesses, indicates interaction between elements, and speaks to "critical questions" because it is an instructional model and thus addresses instructional concerns, whereas other precisely defined models in the literature are research models. The model is displayed in Figure 2.

The instructional model has three major units: the Task Environment, the Composing Process, and the Long-Term Memory. Although a monitor seems critical for the Flower and Hayes model, it is not included in the instructional model because (1) its functioning is not clear, and (2) it is not something that is significant for an instructional model because it is not taught (although with enough instruction and practice a writer will develop this controlling "mechanism").

Other important differences distinguish between the Flower and Hayes model and the instructional model. These differences are discussed below in the following order: Task Environment, Composing Process, and Long-Term Memory. Long-Term Memory is presented last because it stores skills and knowledge put into it by composition instruction. Thus familiarity with the other two units is prerequisite to understanding the description of its elements.

The Task Environment

In the instructional model, the elements of the Task Environment are the Composing Problem, the Text Produced So Far, and Feedback.

The Composing Problem. In consonance with the Flower and Hayes model, the instructional model assumes that the Composing Problem is important because it is

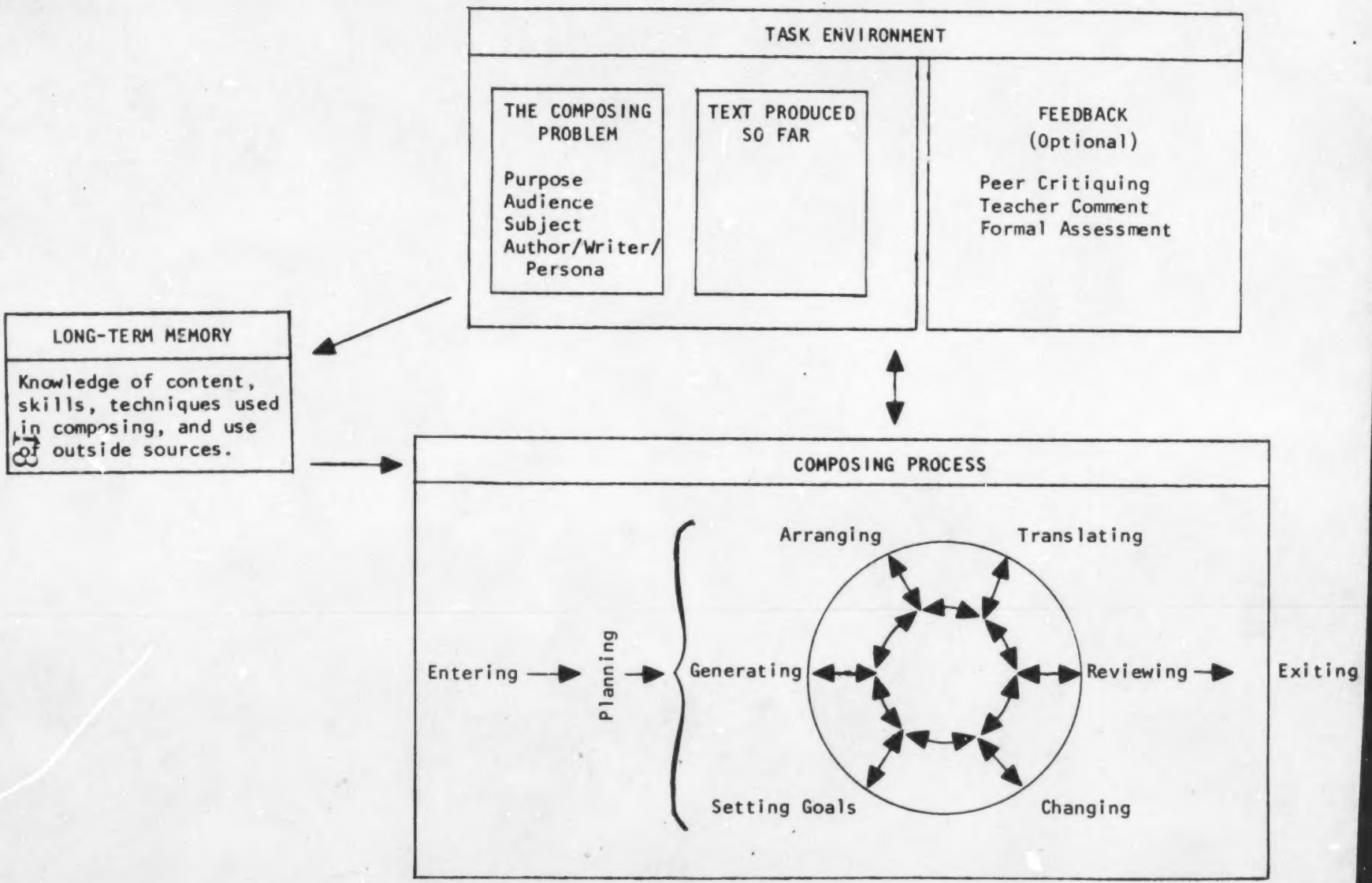

Figure 2. Model of the Composing Situation

what writers solve when they compose. However, the instructional model uses different labels: "Composing Situation" and "Composing Problem" are substituted for what Flower and Hayes' refer to as the "Rhetorical Situation" and "Rhetorical Problem." In classical rhetoric, rhetorical discourse is persuasive discourse. Although many authorities use the term "rhetorical" in referring to discourse in general, the term "composing" is used here to preclude others from interpreting the model as applying only to persuasive discourse.

The constituents of the Composing Problem also differ from those of the Flower and Hayes model. These constituents constrain the choices writers make. For this reason, considerable controversy exists in the research community concerning the nature of these constituents, as is documented by Odell, Cooper, and Courts (1978):

> How do writers actually go about choosing diction, syntactic and organizational patterns, and content? Kinneavy claims that one's purpose--informing, persuading, expressing, or manipulating language for its own sake--guides these choices. Moffett and Gibson contend that these choices are determined by one's sense of the relation between speaker, subject, and audience. Is either of these two claims borne out by the actual practice of writers engaged in drafting or revising? Does either premise account adequately for the choices writers make? Do the two assumptions together provide an adequate account? Could either or both of these assumptions be modified so as to produce a more satisfactory description of the composing process? Or do writers make choices that cannot be explained by a consideration of purpose or of speaker-subject-audience relationships? (p. 6)

Because the instructional model must allow for all contingencies in teaching the Composing Process, and because educators cannot wait for research to discover all the answers, both assumptions noted in the above Cooper, Odell, and Courts comments are incorporated in the Problem. Thus

the Problem consists of both purpose and writer(author)-subject-audience. This resolution is consonant with the perspective of other researchers, who, unlike Flower and Hayes (1980a), either de-emphasize the audience in relation to other elements (e.g., Irmscher, 1980; Schor, 1979) or emphasize purpose as a constraint on discourse decisions (e.g., Nold, 1979a; Bruce, 1978; King, 1978; Kinneavy, 1971). Lloyd-Jones (1978) so firmly believes in the importance of purpose that he attests, ". . . the structure of discourse depends upon purpose [and] the structure governs the quality of all secondary choices" (p. 279).

For the instructional model, purpose is tentatively defined in Kinneavy's (1971) terms, as it is in the previously quoted Odell, Cooper, and Courts (1978) statement--in terms of informing (referential discourse), persuading (persuasive discourse), expressing (expressive discourse), or manipulating language for its own sake (literary discourse). The choice of Kinneavy's purposes is tentative because other systems of purpose classification are viable alternatives, such as Lloyd-Jones' expressing-explaining-persuading schema. For a comprehensive discussion of these classifications of discourse, see Humes (forthcoming d).

In the Composing Problem, the subject is what the discourse is about, and thus it constrains selection of content. The author (or persona) and audience constituents also affect decisions about content, as well as decisions about style. Stylistic considerations include matters of language, syntax, readability, and tone.

The purpose and subject components of the Problem have approximately the same degree of significance for any writing task. However, audience is usually more important for persuasive discourse than it is for expressive,

literary, or referential discourse. The writer-persona component is more important for both expressive and persuasive discourse than it is for literary and referential discourse.

The Text Produced So Far. As in the Flower and Hayes (1980a) model, the second element of the Task Environment is the growing Text itself because it constrains what the writer can subsequently compose.

Feedback. The third element of the Task Environment of the instructional model is an element not included in the Flower and Hayes research model. Flower and Hayes (1980a) say that the Task Environment should include all "those things outside the writer's skin" (p. 7). Thus Feedback is part of the Task Environment of an instructional model, although it is optional because a writer may or may not receive feedback on his/her discourse. The term "Feedback" is used because this label suggests the external nature--the environmental nature--of the element in contrast to the internal nature of the self-evaluation that occurs within the process. Further, "Feedback" does not imply judgment, while judgment is inherent in the term "evaluation."

Feedback is a particularly important element of a model that serves instructional rather than research purposes because Feedback is critical to the development of students' writing abilities. Hirsch (1977) panegyrizes that "Well-conceived commenting on papers . . . is probably more effective than formal lectures on composition or even Socratic questions about composition (Hirsch, 1977, p. 159).

Feedback includes peer critiquing, teacher comment, and formal assessment. Peer critiquing is currently recommended as an important Feedback procedure for a number of reasons. "Peer evaluation offers each

student an opportunity to observe how his or her writing affects others" (Beaven, 1977, p. 150). It can also build self-confidence (Mueller, 1979). It may even provide insight about writing techniques by establishing "a consensus about some objective aspects of writing and . . . those aspects that involve individual value judgments" (Moffett, 1968, p. 194). Peer critiquing has disadvantages as well: It is time consuming, the interpersonal skills it requires take time to develop, and teachers may not trust group processes (Beaven, 1977).

Teacher comment is another form of Feedback. Appropriate teacher comment focuses on teaching, not testing (Lawrence, 1972), and thus may or may not be evaluative. Teacher comment assists the student "by asking questions, by offering suggestions and resources for the student's further investigations" (Draper, 1979, p. 5). Graves (1978) suggests a process-conference approach to teacher comment so that students do not see a composition "as something that can be 'wrong.' It can only be unfinished" (p. 22).

The third kind of Feedback is formal assessment. To it Lloyd-Jones (1978) assigns the awesome task of being the point where research and scholarship should meet. Valid and reliable instruments for formal assessment of writing include a writing sample (Noyes, in Kinneavy and Kline, 1976, and Alloway, 1980). For a complete discussion of formal assessment with writing samples, see Humes (1980).

Thus the Task Environment of the Composing Situation, as is discussed above, consists of a Composing Problem, the Text Produced So Far, and an optional Feedback element. The components of the Composing Problem include the purpose, the audience, the subject, and the writer; components of Feedback include peer critiquing, teacher comment, and formal assessment.

The Composing Process

The second unit of the Composing Situation is the Composing Process itself. During the Composing Process, the choices determined by the Composing Problem are synthesized and implemented. For the instructional model, the components of the Composing Process are Setting Goals, Generating, Arranging, Translating, Reviewing, and Changing. Setting Goals, Generating, and Arranging are kinds of planning activities, but planning itself, exclusive of these activities, does not occur as a separate process.

The elements of the Composing Process are cyclical, or recursive, although one of these planning activities (i.e., Setting Goals, Generating, Arranging) must occur in order for the writer to begin the Process, and some text must be Translated before it can be Changed. These processes also involve activities at a variety of discourse levels. For example, Arranging can entail manipulating large chunks of discourse, a paragraph, or a single sentence.

Setting Goals. Goal-setting is the conceptualization of the individual tactics for solving the Problem. Solving the Problem is "the key task facing any writer . . ." (Stallard, 1976, p. 182). According to Flower and Hayes (1980a), these goals may be as complex as "Conform to the rules of a genre," as specific as "I'll include an illustration," or as simple as "Write down what I can remember" (p. 18), a goal that describes an intent to Generate content. Conversely, goals themselves may be generated (p. 11). Thus either Setting Goals or Generating is the "entrance" to the process (unless complete content is given to the writer by, for example, an instructor, so that the writer's initial task--his/her entrance--is arranging that content).

The boundaries of goal-directed thinking in Flower and Hayes' (1980a and b) protocols are evidenced by a description of the starting point of the goal (e.g., [I'll] open with a question," p. 24), as well as by an evaluation of whether the goal was satisfactorily accomplished (e.g., "That's banal--that's awful," p. 17).

Not only is Setting Goals crucial, but movement among goals is also important. Writers move back and forth between higher-level goals (e.g., "Change their reaction about my job . . .," p. 24) and subgoals (e.g., "Put them in a situation [that illustrates the difficulties of the job]," p. 24). Flower and Hayes see this ability to move back and forth between higher- and lower-level goals as distinguishing between good and poor writers.

Generating. Generating entails gathering information to write about, whether that information is material from external sources or is content discovered within the writer's mind. Bourne, Dominowski, and Loftus (1979) similarly describe Generating as

> Retrieving facts and procedures from the LTM [Long-Term Memory]
>
> Scanning information available in the environment . . .. (p. 238)

This content-collecting process is important: "Until students feel they have information to convey," according to Graves (1978), "it is difficult for them to care about writing or to feel they can speak directly and with authority" (p. 22).

When data are not gathered from external sources, the writer must search his/her own mind for information. Assuming that the writer has such information is reasonable, according to Stallard (1976), who asserts that the degree of effort the writer expends to access that content "will

depend upon the giftedness, experience, and work habits of the writer. The novice or student writer, on the other hand, needs to understand the process and be able to manipulate the variables of knowledge, attitudes, concepts, and beliefs in a more concrete way" (p. 183).

This "manipulating" may involve using invention techniques. Many authorities, such as Odell and Sage (1978), believe that writers must be taught to "invent" content--to engage consciously in the cognitive processes "that will help them discover what they wish to say about a given idea, attitude, or set of data" (p. 10); thus an instructional model of the composing process must allow for the teaching of invention (e.g., Irmscher, 1969; Lauer, 1970; Emig, 1975; Moffett and Wagner, 1976; Young, 1976; Shaughnessy, 1977; D'Angelo, 1979; Klaus, Lloyd-Jones, Brown, Littlefair, Mullis, Miller and Verity, 1979; Odell, 1980).

Invention techniques are called heuristics:*

> A heuristic procedure . . . provides a series of questions or operations that guides inquiry and increases the chances of discovering a workable solution. More specifically, it serves three functions:
>
> > (1) It aids the investigator in retrieving relevant information that he has stored in his mind. (When we have a problem, we generally know more that is relevant to it than we think we do, but we often have difficulty in retrieving the relevant information and bringing it to bear on the problem.)
> >
> > (2) It draws attention to important information that the investigator does not possess but can acquire by direct observation, reading, experimentation, and so on.
> >
> > (3) It prepares the investigator's mind for the intuition of an ordering principle or hypothesis. (Young, Becker, Pike, 1980, p. 120)

*Heuristics also include sets of questions or operations that facilitate other elements of the Composing Situation, such as Reviewing and Arranging.

A number of different heuristic procedures have been devised by composition authorities (e.g., Young, Becker, and Pike, 1970; Burke, 1975; Rohman, 1965; Elbow, 1973). Since using these techniques is purported to facilitate Generating, they are treated in the specifications for composition instruction (see Humes, forthcoming c); they are additionally discussed in Humes, Invention (forthcoming b).

Arranging. Arranging is ordering content; it contributes form to a final product. The element corresponds to Organizing in the Flower and Hayes (1980) model.

Little literature is available on the process of arranging whole discourses, but considerably more information is available on designing individual paragraphs (Larson, 1976). Theories that apply to arranging discourse in general are propounded by Pitkin (1969a and b, 1977), D'Angelo (1974), and Larson (1971). Theories about and techniques for arranging parts of discourse, particularly paragraphs, are promulgated by authorities such as Young, Becker, and Pike (1970), Winterowd (1975), Christensen (1978), Rodgers (1966), Becker (1965), Karrfalt (1966), and Miles (1966).

The elements of and the controversy surrounding Arranging discourse are detailed in Humes, Arranging (forthcoming a). Instructional specifications for the techniques of Arranging are documented in Humes, Specifications (forthcoming c).

Translating. Another component of the Composing Process is Translating. The term "Translating" is adopted from Flower and Hayes (1980a). Terms other than "Translating" could be used to label this process; e.g., "writing," "recording," "implementing," "drafting,"

"articulating" (King, 1978), "transcribing" (Nold, 1979b). However, the term "Translating" was selected because it is an appropriate label for the process of transforming meaning from one form of symbolization (thought) into another form of symbolization (graphic representation).

The huge demands made by Translating while simultaneously functioning in other elements of the Process are discussed by Scardamalia (in Bereiter, 1979):

> Even a casual analysis makes it clear that the number of things that must be dealt with simultaneously . . . is stupendous: handwriting, spelling, punctuation, word choice, syntax, textual connections, purpose, organization, clarity, rhythm, euphony, the possible reactions of various possible readers, and so on. To pay conscious attention to all of these would overload the information processing capacity of the most towering intellects (p. 152).

This mental load becomes less difficult as an increasing number of writing skills become automatic rather than consciously driven. This move to "automation" is expedited by instruction and practice.

Reviewing. Reviewing is an important component that facilitates the recursiveness of the Composing Process. Reviewing includes activities such as a writer's scanning a text to determine (to "estimate") where he/she is in relation to a preconceived arrangement for the discourse, or to refamiliarize him/herself with the already translated text; it also includes judging whether (1) to do further Setting of Goals, Generating, Arranging, or Changing of Text, or (2) to exit from the Process--to stop writing because the discourse is both complete and satisfactory. The possibility of "exiting"* without additional composing behavior predicates separating Reviewing from Changing. This separation further differentiates

*Flower and Hayes (1980a) do not discuss exiting from the Process.

the instructional model from the Flower and Hayes (1980a) model, which has Editing and Evaluating as subprocesses of Reviewing.

According to Nold (1979b), this element includes juxtaposing conventions of written language and the products of the preceding processes. It also involves juxtaposing the text with previously set goals for content and arrangement. Bereiter, Gartshore, Cattani, and Scardamalia (1980) delineate a set of statements to use in Reviewing discourse. These statements can be developed into a heuristic for Reviewing (see Humes, forthcoming c, which details appropriate instructional specifications).

Changing. This subprocess of the Composing Process is characterized by writing behavior that entails "Changing one's mind" as well as Changing the text. It is frequently labeled "reformulating," "revising," "proofreading," "editing." Many other alternate terms for Changing are found in the literature. However, the term "Changing" is used for the instructional model because it is a graphic label for the actual activities of this process. Furthermore, the term is less abstract than such terms as "reformulating."

Changing the content and/or the arrangement occurs when the writer, in Reviewing the text, sees mismatches between his/her intended solution of the Composing Problem and the actual resolution incorporated in the text. This dissonance between intention and actualization creates tension that is resolved by Changing the text (Della-Piana, 1978).

Since Changing affects existing content and arrangement rather than non-translated plans, this element of the Process is not considered a return to Setting Goals, Generating, or Arranging, although mismatches could cause a return to these processes. Furthermore, separating Changing

from other elements of the Process facilitates development of a more viable instructional model: Sometimes instructional techniques are best presented and practiced in isolation before they are incorporated into a holistic learning situation such as composing discourse (e.g., Scardamalia, 1977).

Many authorities emphasize Changing as vitally important to the Composing Process (e.g., Lloyd-Jones, 1978; Popham, 1980; Irmscher, 1979; Corder, 1979; Nold, 1979a and b; Perl, 1979; Sommers, 1978). Bamberg (1978) says that this subprocess is one "variable which has consistently produced significant differences between experimental and control groups . . ." (p. 50).

Shaughnessy (1977) advocates teaching students to Change discourse because they need to realize that "the process that creates precision is itself messy, littering the page with so many deletion marks and emendations as to make some manuscripts almost indecipherable" (p. 222). Students should also be made aware that both professionals and non-professionals change their work, ". . . that no one gets it right the first time; that the professional normally revises three, four, five or more times; and that special pieces may need to be worked over even more" (Walshe, 1979, p. 55).

In consonance with the interpretation of Nold (1979a), Changing involves

> not just correcting the lexicographic and syntactic infelicities of written prose--though at the lower grade-levels these aspects are stressed. It also includes (1) changing the meaning of the text in response to a realization that the original intended meaning of the text is somehow faulty or false or weak . . ., (2) . . . substituting meaning to clarify the originally intended meaning or to follow more closely the intended form or genre . . ., (3) making

> grammatical sentences more readable by deleting, reordering and restating . . . as well as (4) correcting errors of diction, transcription and syntax (p. 105).

This interpretation is compatible with Murray's (1978) view of Changing, which includes manipulating aspects of content and arrangement and adjusting for the conventions of language, mechanics, and style.

For a comprehensive discussion of the literature on Changing, see Gentry (forthcoming).

In summary, the Composing Process unit of the instructional model consists of Setting Goals, Generating, Arranging, Translating, Reviewing, and Changing. Setting Goals logically occurs prior to Generating, according to Flower and Hayes, because ". . . people often decide what they want to do . . . and then generate ideas which will let them do it. But . . . these goals are not simply given to the writer . . ." (p. 11); goals themselves are often Generated.

After the initial Goal Setting and/or Generating occurs,* any component of the Process may perpetrate recyling. For example, Arranging content may serve heuristically to send the writer back to Generating or Setting Goals because a gap in the content triggers an idea. Changing an arrangement might also reveal a gap in content which, after the writer evaluates the gap, recyles composing to Setting Goals; this Goal Setting may stimulate Generating new content and Arranging that new content. Conversely, Reviewing text may lead the writer to exit from the Process.

Long-Term Memory

In addition to the Task Environment and the actual Composing Process, the Composing Situation includes Long-Term Memory. Bourne et al. (1979)

*Or, occasionally, Arranging given content (see p. 17).

define Long-Term Memory as "the memory that holds the vast amount of information we have learned in the past, along with rules for processing that information" (p. 30). Thus Long-Term Memory is a kind of data base from which knowledge is retrieved when it must be consciously attended to and used. According to Flower and Hayes (1980a),

> Sometimes a single cue in an assignment, such as "Write a persuasive . . ." can let a writer tap a stored problem representation and bring a whole raft of writing plans into play (p. 9).

Thus the conscious attending to one element of a set of related superordinate and subordinate concepts may retrieve a whole hierarchy of stored knowledge.

For the instruction model, Long-Term Memory stores the knowledge needed to solve the Composing Problem. This knowledge includes information for implementing the elements of the Composing Process. Thus Long-Term Memory should contain operational information about the recursive operations of Setting Goals, Generating, Arranging, Translating, Reviewing, and Changing. It should also store knowledge of the standard methods of discourse development,* which are particularly facilitative for Setting Goals. The Flower and Hayes (1980a) example protocols document goals that explicitly relate to these techniques; they include contrast and comparison (p. 22), definition (p. 23), and illustration (p. 25). Other protocol goals suggest implicit relationships.

Long-Term Memory also contains knowledge of data-gathering skills, invention techniques, and arrangement plans. Knowledge that implements choices determined by contraints imposed by the constituents of the Task

*The standard methods of development that have evolved from Aristotelian rhetoric include such patterns as definition, illustration/example, comparison or contrast, analogy, classification, cause and effect, process (see Corder, 1979, and D'Angelo, 1980).

Environment is also accessible in Long-Term Memory. Thus each element of the Composing Problem acts as a heuristic to retrieve a specific hierarchy of stored concepts from the Long-Term Memory. To effectuate the Purpose of the Composing Problem, for example, the writer draws on knowledge of the skills and techniques of a specific discourse type. Audience and Writer constituents require storage of alternate word meanings and knowledge of the syntactic options that enhance both syntactic fluency and readability, as well as the concomitant skills for creating style and tone. The Text and the writer's concerns about Feedback will predicate decisions that will tap much of the same knowledge as does the Composing Problem.

Knowledge and skills elicited from Long-Term Memory to Translate goals, content, and arrangement "into a linear piece of written English" (Flower and Hayes, 1980a, p. 11) include syntactic knowledge and knowledge of diction. They also include knowledge of mechanics skills (i.e., punctuation, capitalization and some format skills), handwriting skills, and spelling skills.

All knowledge, techniques, and skills previously noted implement Reviewing. This same knowledge bank is also accessed during Changing.

Detailed information about the specific knowledge, skills, and techniques that must be stored in Long-Term Memory for use during Composing is described in Humes (forthcoming c). These knowledge elements are subject to review and change as instruction is specified. A diagram detailing some of the Memory components that are relevant to composition is displayed in Figure 3. Some of the necessary knowledge will already be part of the writer's Long-Term Memory; the role of composition instruction is to provide the knowledge not yet acquired and the rehearsal/practice that can facilitate Memory storage.

LONG-TERM MEMORY
Knowledge of the composing process
Knowledge of skills and techniques for Planning
Invention techniques
Data-gathering skills
Arrangements
Methods of discourse development
Knowledge of discourse types
Knowledge of skills and techniques of discourse modes
Knowledge of word meaning
Knowledge of syntactic options for fluency, readability, style, tone
Grammatical knowledge
Knowledge of mechanics skills, handwriting skills, spelling skills

Figure 3. Diagram of the Long-Term Memory with Some Components Relevant to Composing.

Interaction of the Task Environment, the Memory, and the Composing Process

Interaction of the three major units of the Composing Situation are displayed in Figure 2. As is illustrated by the arrows in the displayed model, the elements of the Problem constrain choices made during Composing. Setting Goals, Generating, and Arranging are influenced and limited by what purpose is to be accomplished, by what audience the discourse will have, by what the subject is, and by what image (persona) the writer intends to project.

During Translating, the encoding choices will also be influenced and limited by these same Problem elements. For example, in a hypothetical Composing Situation, the writer wishes to elicit a negative decision

(purpose) from a voting public (audience) by composing a criticism of the use of nuclear energy (subject) while conveying an image that he/she is a moral, concerned person (writer/persona). During Translating, he/she will therefore be constrained by the Problem to choose words with negative connotations to describe nuclear energy over their synonyms with positive or neutral affective ramifications.

The elements of the Problem serve heuristically to draw on the knowledge that is stored in the Long-Term Memory about composing discourse to effectuate these considerations of purpose, audience, subject, and writer. For example, prior to the Translating task described above, the writer asks him/herself what kind of language should be used to elicit a negative decision from a voting public in a written criticism of the use of nuclear energy.

During Reviewing, the translated choices are examined to determine whether they are appropriate for solving the Composing Problem. Concomitantly, the existing text is changed so that it more nearly fits within the parameters determined by considerations of purpose, audience, subject, and the writer's persona, as well as by the conventions of written discourse.

In addition to being constrained by the Problem, composing is limited by the Text Produced So Far because the content and arrangement of that text impose restrictions on the directions and range of the subsequent choices.

Composing ideally ends--the writer exits from the Process--when the writer evaluates the text and is satisfied that it is both correct by standards of written English and appropriate for purpose, audience, subject, and persona. If the writer receives Feedback on the text, he or she may then re-enter the Process to incorporate the modifications suggested by Feedback.

CONCLUSION

Appropriate instruction in composition requires teaching the Composing Process. Appropriate instruction further requires as its source a model of the inner processes of the writer. This model should include all other units of the Composing Situation. Such an instructional model has been promulgated here. The model provides the basis for specifying instruction in the composing process as well as instruction on those methods, techniques, and skills not yet stored in the writer's long-term memory. Hopefully, the instructional model contributes to the beginning of a new era--an era of a school, a city, a state, a nation of capable writers.

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